

VARIABLE DISPLACEMENT VANE PUMP  
WITH VARIABLE TARGET REGULATOR

## ABSTRACT

A variable displacement vane-type fluid pump is provided which permits improved regulation of the pump discharge such that the pump can meet the various requirements of lubrication for internal combustion engines at all speeds with minimized use of power. Of course, the vane pump may also be utilized in a wide range of power transmission and other fluid distribution applications. The variable displacement vane pump of the invention may utilize both hydrostatic and mechanical assistance in radially positioning its vanes to ensure efficient and quiet operation of the pump and to facilitate priming of the pump. The vane pump of the invention may also use both hydrostatic and mechanical actuators to control the position of its containment ring or eccentric ring and hence, regulate the output of the pump. According to yet another aspect of the present invention, to prevent inlet flow restriction or cavitation, a valve may be provided to permit some of the pump outlet or discharge flow to bleed into the pump inlet to provide needed velocity and energy to the fluid flow into the pump inlet.